RCH@Home Manual: Parenteral Nutrition via Central Venous Access Device (CVAD)

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This manual is to be used to train Family Choice Program Support
Workers. A separate manual supplied by the Clinical Nutrition team
will be used to train Parents/Guardians.

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1 What is Parenteral Nutrition?

Parenteral Nutrition (PN) is a sterile liquid which is made to be given directly into a child’s blood stream (intravenously). PN is usually given to a child via their Central Venous Access Device (CVAD) which is a tube that is inserted directly into the veins (see section 2 for a full description).

Parenteral nutrition contains sugars, protein, electrolytes, vitamins, minerals and fats which are made specifically for each child depending on what their body needs. The child has PN when they are unable to absorb or process food (or enough food) due to problems with their digestive (gastrointestinal) tract.

2 What is a Central Venous Access Device (CVAD)?

A Central Venous Access Device (CVAD) is a thin rubber tube which is inserted into the child’s body and is used to give medication and nutrition. You may also hear a CVAD being called a central line which is how we will talk about the line in this manual.

Part of the central line sits outside the body (external). And the rest is put into a vein inside the body (intravenous) with the tip of the line ending in or near the heart.

Where you see the central line entering into the body is called the insertion site or exit point. The insertion site needs careful cleaning by a trained person and must always be covered with a waterproof, sterile dressing. There is usually at least 5cm of this line covered in a sterile dressing (depending on size of child). The rest of the external line is not under a dressing but needs to be kept clean and secure.

When the central line is not being used, the end of the external line is “capped off” with a Smartsite® or red cap. There will be a clamp on the external part of the central line. This clamp should not sit under the dressing; please ensure covered with clothing so that the child cannot play with it. It is important that the clamp is left shut (clamped) when the line is not being used and that it is open (unclamped) when the line is being used to give nutrition or medication.

Most Children receiving PN have a Broviac® catheter which is a type of central line (see child specific care page to confirm what central line the child has). When a child has a Broviac catheter there will be a ‘Dacron cuff’ which sits just under the skin and helps to hold the central line in the correct position. The Dacron cuff should not be seen outside of the body.
3 Possible problems with a central line

3.1 Emergency CVAD kit

The following items should be available for use at all times in case emergency troubleshooting of the CVAD is required:

- Transparent dressings (tegederm/IV 3000) x2
- Alcohol swabs (SoluIV®) x4
- Clamps x2
- Packets of sterile gauze x4
- Spare Smartsites x2 (more if double or triple lumen)
- Spare red caps x2
- Roll of tape x1
- Pair of non-sterile gloves x1 (protective wear)

A thermometer should also be easily accessible wherever the child is being cared for so that their temperature can be checked if infection is suspected.

3.2 Line Infection

Anyone with a central line is at risk of getting an infection in their line. A central line infection is a very serious and potentially life threatening problem. Hand washing is the most important thing you can do to prevent a line infection (see infection control manual section).

All signs of infection must be reported to the child’s main caregiver immediately as a child with a central line infection can become very unwell very quickly. If the child’s parent is non-contactable, call an ambulance 000.

3.2.1 Signs of a central line infection

- Central line insertion site looks red and/or has ooze
- Child’s temperature is equal to or greater than 38 degrees Celsius
- Child is breathing faster than normal
- Child is unusually tired or sleepy
- Change in alertness
- Change in behaviour

3.2.2 Preventing an infection

- Follow the 5 moments for hand hygiene (Hand Hygiene Australia)
- Keep the end of the central line out of the nappy and away from urine, faeces and any other secretions
- Keep the external part of the central line clean
- Make sure the central line waterproof dressing is clean, dry and not peeling off the skin
- Do not use any PN solution that looks different to normal (you will be shown what is normal during your training)
- Care when assisting parents with a central line you will be taught to use the appropriate technique. This technique must be followed at all times.

3.3 Accidental disconnection or breakage of the CVAD

If you see any signs of breakage or disconnection tell the main caregiver immediately.
3.3.1 Signs that a line has moved, broken or leaking

- You can see the Dacron cuff that normally sits under the skin
- Fluid is leaking around the insertion site
- You can see swelling or red areas around the insertion site or along where the central line catheter sits under the skin
- Any fluid leaking from the line at any time including when pushing in medications or infusion of PN.
- If there is a large amount of blood leaking from the line call an ambulance 000 for transport to hospital and alert parent(s) when safe to do so. If able then clamp or pinch the line closed so that the blood can’t come out. If able then cover the break with a waterproof dressing
- There may be bubbling in the line

3.3.2 Preventing a breakage

- Check that all tubing has the right connections and that they are secure
- Protect lines from all sharp surfaces or objects
- Make sure the line is strapped firmly to the child’s body
- Make sure no part of the central line is hanging free and able to get caught or pulled on
- Make sure the waterproof central line dressing is on properly (no peeling or tears).

3.4 Troubleshooting Problems with a CVAD

3.4.1 The Smartsite/red cap comes off the end of the line

Make sure the clamp on the line is shut (clamped) above the leak/end. Clean the end of central line with a chlorhexidine and alcohol swab (SoluIV®) for 20 seconds and screw a new Smartsite®/red cap on or cover in a waterproof dressing (IV 3000® or Tegaderm®) if no Smartsite®/red cap available. Tell the parent(s) immediately so that they can seek appropriate help.

3.4.2 Catheter has been cut or broken

If possible move the clamp above the break and clamp the line. If this is not possible, pinch the line to clamp it. Clean the broken end with an alcohol swab and seal with a waterproof dressing, to stop air going up the tube with each breath. Call ambulance 000 as the child will need to go to hospital for the line to be fixed. Inform parent(s) as soon as possible. Place the broken line in a plastic bag and send it to hospital with the child

3.4.3 The clamp comes open when the central line isn’t being used

Close the clamp and tell the parent(s) as they may need to provide further care.

3.4.4 Dressing comes off

If the waterproof dressing is peeling at the edges inform the parents. If the dressing comes completely off, place a waterproof sterile dressing over the central line site. Call the parent(s) who will need to replace the dressing using a sterile procedure.

3.4.5 Central line Dacron cuff that normally sits under the skin is showing on the skin

This is a sign that the line is dislodged. Do not try to move the cuff or line. Tape the central line in place as it is. Place a waterproof sterile dressing over the site. Tell the parent(s) who will need to bring the child to the nearest hospital.

3.4.6 The line comes out

Immediately put pressure on the insertion site with sterile gauze or a clean towel. If using sterile gauze, open the gauze pack and place all of the gauze onto the insertion...
site. Apply pressure to the insertion site for at least five minutes or longer if bleeding has not stopped. After five minutes and the bleeding has stopped you can secure the gauze by putting a waterproof dressing over the top. Immediately advise the parent(s) that the line has come out. If you are unable to get in contact with the parent(s) please call an ambulance 000 and maintain pressure on the area until they arrive to take over. Place the central line in a plastic bag to take to the hospital with the child.

4 Assisting parents with caring for the central line

Support workers may be required to help the child’s parents with setting up sterile dressings, tubing, medication and PN. Special techniques are used to help prevent infection of a central line and these are known as aseptic non touch technique and surgical aseptic technique.

4.1 What is Aseptic technique?

Aseptic technique is used to prevent bacteria being transferred from one place such as our hands or equipment to another place such as a child’s central line or their equipment used to care for their central line. There are different kinds of aseptic techniques but when caring for a central line at home the support worker will use aseptic non-touch technique and the parent will use a combination of aseptic non-touch technique and surgical aseptic technique.

4.1.1 Aseptic non touch technique (ANTT)

Aseptic Non Touch Technique involves careful hand hygiene and not touching the key parts of the equipment that will be used by the parent. Key parts of equipment are usually the parts of equipment that connect to another piece of equipment, such as the tip of a syringe, both ends of a needle, the blue tip of a smart site. The support worker may be required to open up the packaging of equipment such as needles and syringes but it is very important not to touch (or let anything touch) the key parts of the equipment that is inside the packaging.

Examples of Key parts (above)

4.1.2 Surgical Aseptic technique

This technique is used by the parent when completing a central line dressing change, Smartsite® or red cap change. This is never done by the support worker, however the support worker may assist with gathering and opening equipment and supervising/distracting the child while the parent completes the task. Surgical Aseptic technique involves a mixture of:

- Hand hygiene
- Sterile gloves
- Clean work place such as an open dressing pack
- Sterile equipment that has been opened, without being touched, onto the opened dressing pack. Once the packaging is opened, the equipment must not be touched by anybody other than the person who is performing the task. This person can only touch it when they have washed their hands and have their sterile gloves on.
- Not touching dirty areas once they have washed their hands and are wearing sterile gloves

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4.2 Support workers role when connecting the child to TPN (hook on) when connecting onto a Smartsite (Aseptic Non Touch Technique)

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do this task independently or the support worker may help with gathering the equipment, opening the equipment (leaving it in the packaging and protecting key parts) and providing comfort and distraction to the child.

1. Remove all jewellery and tie hair back (if long)
2. Complete hand hygiene
3. Collect supplies which may include the following (be guided by parent)
   - Chlorhexidine hand gel
   - Parenteral Nutrition (supplied by Baxter Australia)
   - IV tubing to administer PN
   - Bodyguard pump (or other RCH approved pump)
   - Alcohol 70% Chlorhexidine 2% swab
   - Gauze pack
   - 10ml Syringe x1
   - 10ml Saline for injection ampoules x1
   - Blunt drawing up needles x1
   - Red cap x1
   - Sterile gloves
4. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%
5. Complete hand hygiene
6. Open the syringe packaging by peeling the backing plastic off. Leaving the syringe in its clear plastic wrapper (as pictured), place the syringe on the work surface, being careful not to touch the key parts.
7. Open the drawing up needle packaging by peeling the backing paper off. Leaving the needle in its clear plastic wrapper (as pictured), place the needle on the work surface, being careful not to touch the key parts.
8. Open the red cap packaging by peeling the backing paper off. Leaving the red cap in its clear plastic wrapper (as pictured), place the red cap on the work surface, being careful not to touch the key parts.
9. The parent will now prepare the equipment using Aseptic Non touch technique.

10. Complete hand hygiene again

11. Assist the parent by providing reassurance and comfort or distraction to the child.

During a hook on the parent may ask the support worker to silence the pump – this will be explained further in section 6.

4.3 Support workers role when connecting the child to TPN (hook on) when using Red caps (Surgical Aseptic Technique)

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 11 on their own, or the support worker can prepare the equipment. The support worker may only need to help with steps 12 – 17 making sure that hand hygiene is completed before starting step 12.

1. Remove all jewellery and tie hair back (if long)

2. Complete hand hygiene

3. Collect supplies which should include the following (be guided by parent)
   - Chlorhexidine hand gel
   - Parenteral Nutrition (supplied by Baxter Australia)
   - PN giving set
   - Bodyguard pump (or other RCH approved pump)
   - Dressing pack
   - Alcohol/chlorhexidine liquid
   - Gauze pack
   - 10ml Syringe
   - 10ml Saline for injection ampoules
   - Blunt drawing up needles.
   - Sterile gloves

4. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%

5. Complete hand hygiene

6. Peel open the sterile glove packaging and place the packaging onto a clean area. The parent will use these gloves.

7. Remove the dressing pack from the plastic packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile dressing pack.

8. When directed by parent, pour alcohol solution into the plastic dressing tray. Make sure you don't hold the bottle of alcohol/chlorhexidine too close to the dressing pack so that you don't accidently touch the dressing pack with the bottle.

Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

9. Open syringe packaging in the air above the dressing pack and let the syringe fall gently onto the open dressing pack.
10. Open the drawing up needles packaging in the air above the dressing pack and let the needle fall gently onto the open dressing pack

11. Open PN giving set packaging in the air above the dressing pack and let the giving set fall gently onto the open dressing pack

12. The parent will prepare the equipment. When the parent is ready you can now open the saline ampoules and hold them steady while the parent “draws up” the saline into the sterile syringes.

13. The equipment is now prepared

14. Complete hand hygiene again

15. Assist the parent by providing reassurance and comfort or distraction to the child

16. When the parent asks you to you will need to unclamp the clamp on the central line.

17. When the parent asks you to you will need to clamp the clamp on the central line

During a hook on the parent may ask the support worker to silence the pump – this will be explained further in section 6.

4.4 Support workers role when disconnecting (hook off) the child from TPN (Surgical Aseptic Technique) or when an extra Smartsite® change is required

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 12 and the support worker may only need to help with steps 13 – 17, making sure that hand hygiene is completed before starting step 13 (see child specific care page for support worker role).

1. Remove all jewellery and tie hair back (if long)

2. Complete hand hygiene

3. Have all equipment available which should include the following:
   - Dressing pack
   - Chlorhexidine 0.5% in Alcohol 70%
   - Gauze pack
   - 10ml Syringes x2
   - 10ml Saline for injection ampoules x2
   - Drawing up needles x2
   - Smart site or red cap (see child specific care page)
   - Heparin (as instructed by parent)
   - Sterile gloves

4. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%

5. Complete hand hygiene

6. Peel open the sterile glove packaging onto a clean area. The parent will use these gloves.

7. Remove the dressing pack from the packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile drape
8. When directed by parent, pour alcohol solution into the dressing tray. Make sure you don't hold the bottle of alcohol too close to the dressing pack so that you don't accidently touch the dressing pack with the bottle.

Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

9. Open the Smartsite®/red cap packaging in the air above the dressing pack and let the Smartsite®/red cap fall gently onto the open dressing pack

10. Open the syringes packaging in the air above the dressing pack and let the syringes fall gently onto the open dressing pack

11. Open the drawing up needles in the air above the dressing pack and let the needles fall gently onto the dressing pack

12. When the parent is ready (has completed hand hygiene and is wearing sterile gloves) the support worker can open the saline and heparin ampoules and hold them steady while the parent “draws up” the saline and heparin into the sterile syringes.

13. The equipment is now prepared.

14. Complete hand hygiene again

15. Assist the parent by providing reassurance and comfort or distraction to the child.

16. When the parent asks you to you will need to unclamp the clamp on the central line.

17. When the parent asks you to you will need to clamp the clamp on the central line.

4.5 Support worker’s role when changing a central line dressing (Surgical Aseptic technique)

The waterproof central line dressing is changed every seven days, or more often if needed. This is done by the child’s parents. The support worker can help with setting up the equipment and caring for the child while the parent changes the dressing.

The support worker may only need to assist with some of the tasks outlined below, the parents may choose to do steps 1 – 12 and the support worker may only need to help with steps 13 – 17, making sure that hand hygiene is completed before starting step 13.

1. Remove all jewellery and tie hair back (if long)

2. Have all equipment available which should include the following:

   - Dressing pack
   - Chlorhexidine 0.5% in Alcohol 70%
   - IV 3000 or tegaderm waterproof dressing
   - Sterile gloves
   - Gauze pack

3. Wipe work surface with supplied cleaning agent such as chlorhexidine 0.5% in Alcohol 70%

4. Complete hand hygiene

5. Peel open the sterile glove packaging onto a clean area. The parent will use these gloves.
6. Remove the dressing pack from the packaging then open the dressing pack onto clean area taking care to only touch the outside corners of the sterile drape

7. When directed to, pour alcohol solution into the dressing tray. Make sure you don’t hold the bottle of alcohol too close to the dressing pack so that you don’t accidently touch the dressing pack with the bottle.

Being careful not to let the packaging of the equipment touch the open dressing pack and being careful not to touch the equipment that is inside the packaging please:

8. Open the packaging of the waterproof dressing in the air above the dressing pack and let the dressing fall gently onto the dressing pack

9. Open the packaging of the spare gauze in the air above the dressing pack and let the gauze fall gently onto the dressing pack

10. The equipment is now prepared

11. Complete hand hygiene again

12. The parent will now complete the central line dressing change. Assist the parent by providing reassurance and comfort or distraction to the child to prevent them from touching their central line, or pulling it out.

13. The support worker may need to hold the line for the parent while they clean the insertion site. Do not touch the skin or the line near the insertion site.
5 The support workers role with The Bodyguard 323 pump

The bodyguard pump is used to deliver the PN to the child. The support worker is not allowed to be involved in programming or troubleshooting the pump.

Under direct supervision from the child’s main caregiver the support worker is allowed to:

- Silence the pump – only during set up, before the PN has started
- Load the giving set into the pump – the parent must visually check that this is loaded correctly before the support worker closes the pump door.
- Press the prime button when the parent requests them too

The support worker may not touch these buttons on the pump at any other time than when a parent is directing them.

5.1 Silencing the Pump

During set up the pump may alarm if it is turned on for two minutes but not infusing anything. The pump will display the message “Pump unattended”. It is expected that this alarm will sound during set up of the PN. The parent may ask the support worker to silence the alarm during the set up.

When the alarm is sounding “press the red Stop/No button once.

The “pump unattended” alarm will continue to sound every two minutes until the parent starts the infusion. The support worker may need to silence the alarm a few times during the setup of the PN.
5.2 Loading the Set

Under supervision

1. Open the pump door by flipping the silver “pump door release” catch located on the lower right side of the pump (no. 5 on the diagram above)
2. Load the set into the pump making sure that the Key is inserted into the ‘keyway’ with the protrusions on the key facing upwards. The key can only be loaded one way so fluid flows in the direction of the arrows inside the pump door (See Diagram below).
3. When the set is loaded into the pump and has been visually checked by the parent, the support worker can close the pump door.

5.3 Priming the line

Priming the line means to let fluid run out of the bag of PN and down through the intravenous tubing which is also known as a giving set. This tubing (giving set) is used to deliver the PN from the bag to the child through their central line. Priming the line is only done during set up of the PN, it is never done when the tubing is connected to the child’s central line as this will cause the child to get too much PN too fast which can make them sick.

To prime the line:

1. The parent will tell the support worker to “Press Prime the line"
2. Before pressing the Prime button check and make sure that the giving set is loaded correctly into the pump and that the giving set is not connected to the child. The parent should hold the end of the giving set over a container to catch any drips. The support worker may now press the orange "Prime/Bolus" button on the bodyguard 323 pump. The line might need to be primed twice if the PN doesn’t go all the way to the end of the giving set. The parent will instruct the support worker if this is needed.

References:

Nutrition Support Service, Home Parenteral Nutrition: instructions for the administration of parenteral nutrition at home. Royal Children’s Hospital, Melbourne

Bodyguard 323 training guide